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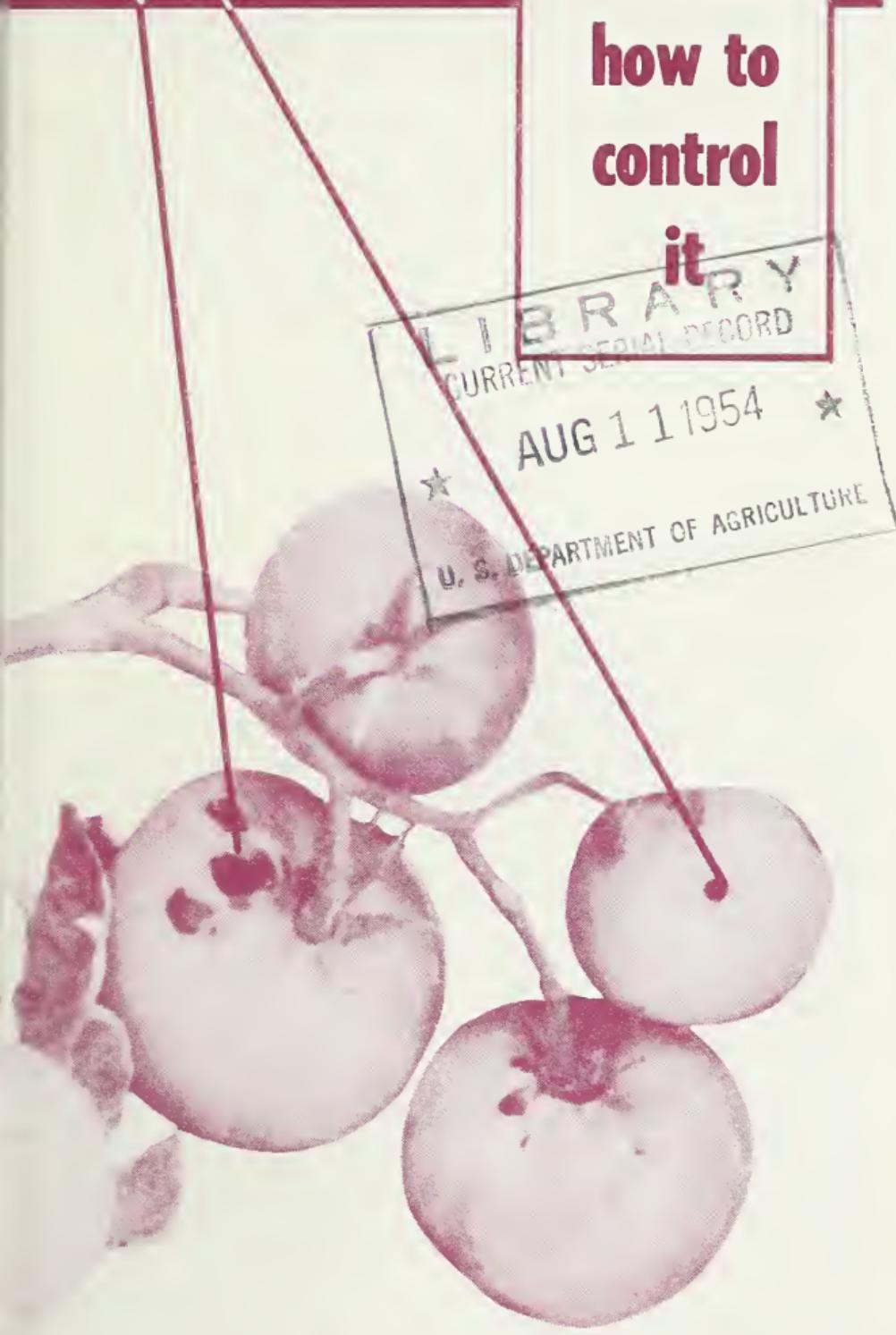
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The TOMATO FRUITWORM

how to
control

it



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U. S. DEPARTMENT OF AGRICULTURE

The TOMATO FRUITWORM

How to control it

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The tomato fruitworm eats deep holes in tomato fruits. It occurs all over the United States, and does more damage to tomatoes than any other insect. An individual fruitworm commonly devours or ruins four or five fruits.

Tomato growers in the southern part of the country lose about \$15 million each year because of tomato fruitworm damage. In seasons favorable to the insect's development—about every third year—losses are equally heavy in northern areas. By applying insecticides and using other control measures, growers can cut these losses 90 percent or more.

The scientific name of the tomato fruitworm is *Heliothis armigera*. When this insect occurs on corn it is called the corn earworm; and on cotton, the bollworm.

DEVELOPMENT

The adult of the tomato fruitworm is a moth. The other life stages are egg, larva, and pupa.

The female moths lay their eggs singly on the tomato plants—usually on the leaves. In 4 to 6 days the eggs hatch into larvae (fruitworms), which immediately begin to feed on the foliage. In a day or two the fruitworms begin to move down the stems and eat into the fruits.

The fruitworms become full grown in about 20 days. Each drops or crawls to the ground, burrows 1 to 3 inches, and transforms to a pupa, which develops into a moth. The pupal stage lasts at least 2 weeks. Some individuals may remain in this stage until spring.

The moths emerge from the ground and start a new life cycle: They mate, and the females lay eggs.

There are more generations of fruitworms, and more severe infestations, in southern than in northern areas. Four or five generations are produced each year in southern areas.

CONTROL

The insecticides DDT, TDE, and cryolite are effective against the tomato fruitworm on tomatoes. DDT

or TDE is applied as a dust or as a spray. Cryolite is used in bait.

After deciding what insecticide to use, make three applications at 2-week intervals. Timing of the first application is important. It should be made when the first fruits of the main crop are setting. At this time the fruits are 1/2 inch or less in diameter, and there are about five on each plant. Check on the fruit set, not the size of the plants, which may vary from 1 to 4 feet in diameter when the fruits are setting.

DUSTS AND SPRAYS

Apply the dust or the spray when there is little or no wind. Get it all over the foliage. The fruitworms must be killed while on the foliage—before they get to the fruit.

Dusts.—In each of the three applications, apply a dust containing 10 percent of DDT or TDE at the rate of 30 pounds per acre (1 ounce per 100 square feet). With power dusters use two nozzles per row. With hand equipment dust one side of the row, then the other.

Sprays.—A spray is prepared by mixing DDT or TDE wettable powder *or* DDT or TDE emulsifiable concentrate with water.

Use 4 pounds of 50-percent wettable powder or 1 gallon of 25-percent emulsifiable concentrate (or the equivalent) per acre. Mix it with 50 to 150 gallons of water if you use a high-pressure ground sprayer of the usual type or with 5 to 10 gallons of water if you use a low-pressure sprayer. For small gardens, use 1 level tablespoonful of the wettable powder per 100 square feet; mix it with 1 quart of water.

BAIT

An effective bait may be prepared by mixing cryolite (90-percent sodium fluoaluminate) with cornmeal. The proportions are 1 pound of cryolite to 10 pounds of cornmeal. Mix thoroughly. Scatter the bait evenly over the foliage by hand at the rate of about 60 pounds per acre (2 ounces per 100 square feet).

CULTURAL METHODS

Applying insecticides is the chief means of controlling the tomato fruitworm, but there are other things you can do: Disking or plowing of tomato fields and corn fields immediately after harvest kills many of the pupae in the soil. . . . Kill each fruitworm that you find while picking tomatoes.

If Other Pests Occur With the Tomato Fruitworm . . .

Tomato fruitworm infestations are sometimes accompanied by infestations of other pests.

Ordinary infestations of hornworms, the Colorado potato beetle, and cutworms can be controlled by using DDT dust or spray as recommended for the tomato fruitworm. To control severe infestations of hornworms, use TDE.

If the tomato russet mite¹ is in your area, include sulfur in the dust or spray. Use a dust that contains 50 percent of dusting sulfur; or, if you spray, add 10 pounds of wettable sulfur to the quantity of spray to be applied to 1 acre. Sulfur residues in canned tomatoes may cause discoloration and off-flavor. In California, canners have found that sulfur is easily removed from the tomatoes by the use of plenty of water in the washing process.

A severe infestation of leaf miners² may require the application of parathion. You can buy a dust mixture containing 5 percent of DDT or TDE and 2 percent of parathion. Do not mix your own parathion dust (see precautions). If you plan to spray the tomatoes, add 2 pounds of 25-percent parathion wettable powder or 1 quart of 25-percent parathion emulsifiable concentrate to the quantity of spray to be applied to 1 acre.

¹ *Vasates lycopersici*.

² *Liriomyza* sp.



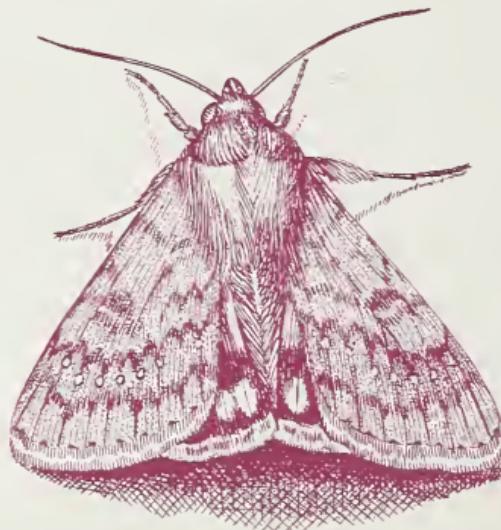
Make first application of insecticide when fruits have appearance shown here.

PRECAUTIONS

IN GENERAL.—Most insecticides are poisonous to people and to animals. Store insecticides where children, pets, and livestock cannot reach them. Handle them with care. Follow all directions, and heed all precautions, on the labels.

DDT AND TDE.—If the emulsifiable concentrate, or spray containing it, gets on the skin, it may cause irritation; avoid unnecessary exposure of the skin while mixing and applying spray. Avoid breathing the dust. Remove residues from fruit by washing or wiping before it is marketed or eaten.

PARATHION.—Parathion is dangerous to handle and apply. Do not mix your own parathion dust. The dust or spray should be applied only by a trained operator who will observe the precautions prescribed by the manufacturer and assume full responsibility for safety. . . . Do not apply parathion to tomatoes within 21 days of harvest.



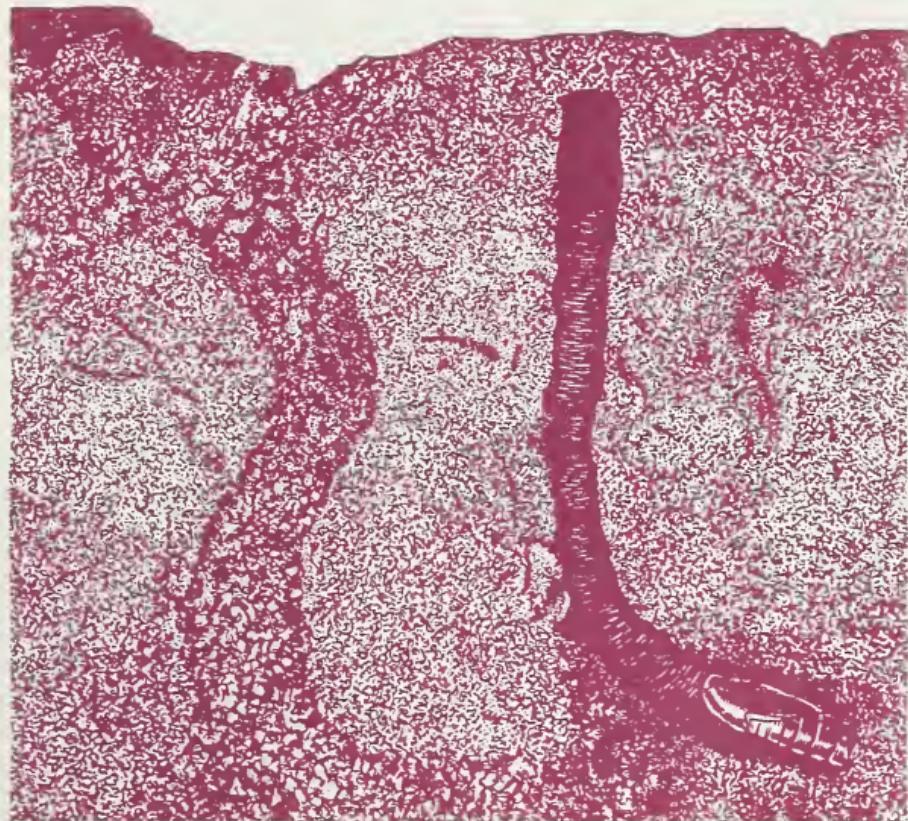
The adult of the tomato fruitworm is a buff-colored moth about 1 inch long (above). Females lay white, spherical eggs smaller than a pinhead. The young larvae feed on tomato leaves until they are about $\frac{1}{2}$ inch long (below). Newly hatched larvae are whitish and less than $\frac{1}{8}$ inch long. They soon become brown.



When they become about $\frac{1}{2}$ inch long, the larvae begin feeding on the fruit. Full-grown larvae are about $1\frac{1}{4}$ inches long. They may be green, brown, or pink. The heads are orange.



The pupae, to which the larvae transform after burrowing into the soil, look like brown capsules. They are about $\frac{3}{4}$ inch long. Below: Pupa in its cell at the bottom of a burrow.



NOTE.—To assist growers in identifying the tomato fruitworm, the Department of Agriculture has published a picture sheet showing the life stages of the insect in natural color. If you wish a copy, write to the Office of Information, U. S. Department of Agriculture, Washington 25, D. C. Ask for Picture Sheet No. 13.

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